OFFICIAL PUBLICATION

of the

UNIVERSITY OF MARYLAND

Issued monthly by the University of Maryland at College Park, Md.,
as second-class matter, under Act of Congress of July 16, 1894.

Vol. 26 FEBRUARY, 1929 No. 2

THE GRADUATE SCHOOL

ANNOUNCEMENTS

1929-1930

THE UNIVERSITY *of* MARYLAND

THE GRADUATE SCHOOL ANNOUNCEMENTS 1929-1930

COLLEGE PARK,
MARYLAND

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CALENDAR

1929-1930

First Semester

1929		
Sept. 17-19	Tuesday-Thursday	Registration.
Sept. 20	Friday	Instruction for first semester begins.
Sept. 26	Thursday	Last day to change registration.
Oct. 3	Thursday	Last day to file applications for admission to candidacy for the Doctor's degree at Commencement of 1930.
Nov. 28	Thursday	Thanksgiving Day. Holiday.
Dec. 14	Saturday, 12.10 p.m.	Christmas Recess begins.
1930		
Jan. 3	Friday, 8.20 a.m.	Christmas Recess ends.
Jan. 25-Feb. 1	Saturday-Saturday	First semester examinations.

Second Semester

Jan. 20-Feb. 3	Monday-Monday	Registration for second semester.
Feb. 4	Tuesday, 8.20 a.m.	Instruction for second semester begins.
		Last day to file applications for admission to candidacy for the Master's degree at Commencement of 1930.
Feb. 10	Monday	Last day to change registration.
Feb. 22	Saturday	Washington's Birthday. Holiday.
Mar. 25	Tuesday	Observance of Maryland Day.
Apr. 15-Apr. 23	Tuesday, 4.10 p.m. Wednesday, 8.20 a.m.	Easter Recess.
May 20	Tuesday	Last Day to deposit Doctor's thesis in the office of the Dean of the Graduate School.
May 27	Tuesday	Last day to deposit Master's thesis in the office of the Dean of the Graduate School.
May 28-June 4	Wednesday-Wednesday	Second semester examinations for seniors.
May 28-June 7	Wednesday-Saturday	Final Oral examinations.
May 30	Friday	Memorial Day. Holiday.
June 2-7	Monday-Saturday	Second semester examinations.
June 8	Sunday, 11 a.m.	Baccalaureate Sermon.
June 9	Monday	Class Day.
June 10	Tuesday, 11 a.m.	Commencement.

Summer Term

June 25	Wednesday	Summer School begins.
Aug. 5	Tuesday	Summer School ends.

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GENERAL INFORMATION

HISTORY AND ORGANIZATION

In the earlier years of the Institution the Master's degree was frequently conferred, but the work of the graduate students was in charge of the departments concerned, under the supervision of the General Faculty. The Graduate School of the University of Maryland was established in 1918 and organized graduate instruction leading to both the Master's degree and Doctor's degree was undertaken. The faculty of the Graduate School includes all members of the various faculties of instruction and research who give instruction in approved graduate courses. The general administrative functions of the Graduate Faculty are delegated to a Graduate Council, of which the Dean of the Graduate School is chairman.

Work in accredited research laboratories of the United States Department of Agriculture and other local national research agencies may be accepted when previously arranged, as residence work in fulfillment of the thesis requirement for a degree. The laboratories are located within easy reach of the University.

LOCATION

The University of Maryland is located at College Park, in Prince George's County, Maryland, on the Baltimore and Ohio Railroad, eight miles from Washington and thirty-two miles from Baltimore. Washington, with its wealth of resources is easily accessible by train, street car or bus.

LIBRARIES

In addition to the resorces of the University library, the great libraries of the National Capital are easily available for reference work. Because of the close proximity of these libraries to College Park they are a very valuable asset to research and graduate work at the University of Maryland.

The new library building now under construction at College Park contains a number of Seminar rooms and other desirable facilities for graduate work.

THE GRADUATE CLUB

The graduate students maintain an active Graduate Club. Several meetings for professional and social purposes are held during the year. Students working in different departments have an opportunity to become acquainted with one another and thus profit by the broad cultural values derived from contacts with fellow students working in different fields.

GENERAL REGULATIONS

ADMISSION

Graduates of colleges and universities of good standing are admitted to the Graduate School. Before entering upon graduate work all applicants must present evidence that they are qualified by their previous work to pursue with profit the graduate courses desired. Application blanks for admission to the Graduate School are obtained from the office of the Dean. After approval of the application, a matriculation card, signed by the Dean, is issued to the student. This card permits the student to register in the Graduate School. After payment of the fees, the matriculation card is stamped and returned to the student. It is the student's certificate of membership in the Graduate School, and may be called for at any succeeding registration.

Admission to the Graduate School does not necessarily imply admission to candidacy for an advanced degree.

REGISTRATION

All students pursuing graduate work in the University, even though they are not candidates for higher degrees, are required to register at the beginning of each semester in the office of the Dean of the Graduate School, Room DD 117 Chemistry building. Students taking graduate work in the Summer School are also required to register in the Graduate School at the beginning of each session. The program of work for the semester or summer session is entered upon two course cards, which are first signed by the professor in charge of the student's major subject and then by the Dean of the Graduate School. One card is retained in the Dean's office. The student takes the other card, and, in case of new students, also the matriculation card, to the Registrar's office, where a charge slip for the fee is issued. The charge slip, together with the course card, is presented at the Cashier's office for adjustment of fees. After certification by the Cashier that fees have been paid, class cards are issued by the Registrar. Students will not be admitted to graduate courses without class cards. Course cards may be obtained at the Registrar's office or in the Dean's office. The heads of departments usually keep a supply of these cards in their respective offices.

GRADUATE COURSES

Graduate students must elect for credit in partial fulfillment of the requirements for higher degrees only those courses designated, *For Graduates or For Graduates and Advanced Undergraduates.* Graduate students may elect courses numbered from 1 to 99 in the general catalogue but graduate credit will not be allowed for these courses. Students with inadequate preparation may be obliged to take some of these courses as prerequisites for advanced courses.

PROGRAM OF WORK

The professor who is selected to direct a student's thesis work is the student's advisor in the formulation of a graduate program including suitable

minor work. This program also receives the approval of the Dean by his endorsement of the student's course card.

To encourage thoroughness in scholarship through intensive application, graduate students in the regular sessions taking courses carrying full graduate credit are limited to a program of thirty credit hours for the year. Students holding half-time graduate assistantships are usually limited to eight credit hours per semester. One or two extra credits may be allowed if four or five of the total constitute Seminar and Research work.

Residence credit for all research work relating directly to the Master's or Doctor's thesis should be stated as credit hours on the registration card for the semester in which the work is to be done. If a student is doing research work only under the direction of an official of the institution he must register and pay for a minimum of four credit hours per semester. The number of credit hours reported at the end of the semester will depend upon the work accomplished, but it will not exceed the number for which the student is registered.

SUMMER GRADUATE WORK

Graduate work in the Summer Session may be counted as residence toward a graduate degree. Four Summer Sessions may be accepted as satisfying the residence requirement for the Master's degree. By carrying approximately six semester hours of graduate work for four sessions and upon submitting a satisfactory thesis, students may be granted the degree of Master of Arts or Master of Science. In some instances a fifth summer may be required in order that a satisfactory thesis may be completed. Teachers and other graduate students working for a degree on the summer plan must meet the same requirements and proceed in the same way as do students enrolled in the other sessions of the University.

Students who are not working for a degree on the regular Summer School plan may satisfy one-third of an academic year's residence by full-time graduate work for 11 or 12 weeks during the summer, provided satisfactory supervision and facilities for summer work are available in the student's field.

The University publishes a special bulletin giving full information concerning the Summer School and the graduate courses offered during the Summer Session. This bulletin is available upon application to the Registrar of the University.

GRADUATE WORK IN PROFESSIONAL SCHOOLS

Graduate courses and opportunities for research work are offered in some of the professional schools at Baltimore. These courses do not appear in this announcement, but they are listed in the special bulletins of the professional schools. Students pursuing graduate work in the professional schools must register in the Graduate School and meet the same requirements and proceed in the same way as do graduate students in other departments of the University.

GRADUATE WORK BY SENIORS IN THIS UNIVERSITY

Seniors who have completed all of their undergraduate courses in this University at the end of the first semester, and who continue their residence in the University for the remainder of the year, are permitted to register in the Graduate School and secure the privileges of its membership, even though the bachelor's degree is not conferred until the close of the year.

Seniors of this University, who have nearly completed the requirements for the undergraduate degree, by the end of the first semester, may with the approval of their undergraduate Dean and the Dean of the Graduate School, register in the undergraduate college for graduate courses which will be transferred for graduate credit toward a degree at this Univesity, but the total of undergraduate and graduate courses must not exceed 15 credits for the semester.

ADMISSION TO CANDIDACY FOR ADVANCED DEGREES

Applications for admission to candidacy for either the Master's or the Doctor's degree are made on application blanks, which are obtained at the office of the Dean of the Graduate School. These are filled out in duplicate and after the required endorsements are obtained, the applications are acted upon by the Graduate Council. An official transcript of the candidate's undergraduate record and any graduate courses completed at other institutions must accompany the application unless these are already on file in the Dean's office.

A student making application for admission to candidacy for the degree of Doctor of Philosophy must also obtain from the head of the Modern Language department, a statement that he possesses a reading knowledge of French and German.

Admission to candidacy in no case assures the student of a degree, but merely signifies that the candidate has met all of the formal requirements and is considered by his instructors sufficiently prepared and able to pursue such graduate study and research as is demanded by the requirements of the degree sought. The candidate's record in graduate work already completed must show superior scholarship. A preliminary examination or such other substantial tests as the departments elect may also be required for admission to candidacy for the degree of Doctor of Philosophy.

The time to make application for admission to candidacy is stated under the heading of requirements for the degree sought.

REQUIREMENTS FOR THE DEGREES OF MASTER OF ARTS AND MASTER OF SCIENCE

Advancement to Candidacy. Each candidate for the Master's degree is required to make application for admission to candidacy not later than the date when instruction begins for the second semester of the academic year in which the degree is sought, but not until at least the equivalent of one semester of graduate work has been completed.

Residence Requirements. The standard residence requirement is one academic year, but this does not mean that the work prescribed for each individual student can always be completed in one academic year. Inadequate preparation for the graduate courses the student wishes to pursue may make a longer period necessary.

Credits and Scholarship Requirements. The minimum credit requirement is 30 semester hours in courses approved for graduate credit. From 10 to 12 credits must lie outside the major subject and form a coherent group of courses intended to supplement and support the major work. A minimum of at least 18 credits, including the thesis credits, must be devoted to the major subject. At least one-half of the total credits in the major subject must be earned in courses for graduates only. The credits for thesis work are included. The number of major credits allowed for thesis work will range from 6 to 10, depending upon the amount of work done and upon the course requirements in the major subject. The maximum total credit for the one hour per week seminar courses is limited to four semester hours in the major subject and to two semester hours in the minor subjects. At least 20 of the 30 semester credits required for the Master's degree must be taken at this institution. In certain cases graduate work done in other graduate schools of sufficiently high standing may be substituted for the remaining required credits, but the final examination will cover all graduate work offered in fulfillment of the requirements for the degree. The Graduate Council, upon recommendation of the Head of the major department passes upon all graduate work accepted from other institutions. No credits are acceptable for an advanced degree that are reported with a grade lower than "C."

Thesis. The thesis required for the Master's degree should be typewritten on a good quality of paper 11 x 8½ inches in size. The original copy bound in a special cover, obtained at the book store, must be deposited in the office of the Graduate School not later than two weeks before commencement. One or two additional unbound copies should be provided for use of members of the examining committee prior to the final examination.

Final Examination. The final examination is conducted by a committee appointed by the Dean of the Graduate School. The student's advisor acts as the chairman of the committee. The other members of the committee are persons under whom the student has taken most of his major and minor courses. The chairman and the candidate are notified of the personnel of the examining committee at least one week prior to the period set for the examination. The chairman of the committee selects the exact time and place for the examination and notifies the other members of the committee and the candidate. The examination should be conducted within the dates specified and a report of the examination sent to the Dean as soon as possible after the examination. A special form for this purpose is supplied to the chairman of the committee. Such a report is the basis upon which recommendation is made to the faculty that the candidate be granted the degree sought.

The final examination is oral, but a previous written examination in courses of the semester immediately preceding the examination may be required at the option of the individual members of the committee. The period for the oral examination should be about one hour.

The examining committee also approves the thesis and it is the candidate's obligation to see that each member of the committee has ample opportunity to examine a copy of the thesis prior to the date of the examination.

A student will not be admitted to final examination until all other requirements for the degree have been met.

SPECIAL REQUIREMENTS FOR SUMMER SCHOOL STUDENTS PURSUING GRADUATE WORK FOR THE MASTER'S DEGREE IN EDUCATION

1. Courses numbered from 100 to 199 should carry additional work for graduate credit, such as special readings, special problems, special term papers, etc.
2. Academic graduate courses will be accepted up to one-third of the requirement for the Master's degree. (Approximately 10 semester hours).
3. Ordinarily, theses for students majoring in education should not be rated more than six hours.
4. Graduate students working for the Master's degree on the summer plan must submit their choice of thesis title to the professor in charge of their major subject and defend their thesis subject before their major graduate committee not later than the third summer session of their attendance for graduate study at the University.
5. Graduate students working for the Master's degree on the summer plan must make application for admission to candidacy for the Master's degree not later than the third summer session of their attendance for graduate study at the University. Application blanks may be obtained at the office of the Dean of the Graduate School.
6. The completed theses of summer graduate students in education must be submitted before March 1st of the year in which the degree is expected to be granted. (The degrees for summer graduate students will be granted at the regular commencement in June following the completion of their work).

REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Advancement to Candidacy. Candidates for the Doctor's degree must be admitted to candidacy not later than one academic year prior to the granting of the degree. Applications for admission to candidacy for the Doctor's degree must be deposited in the office of the Dean not later than October 1 of the same year.

Residence. Three years of full-time resident graduate study beyond the Bachelor's degree or two years beyond the Master's degree are required. The

first two of these years may be spent in other institutions offering standard graduate work. On a part-time basis the time needed will be correspondingly increased. The degree is not given merely as a certificate of residence and work, but is granted only upon sufficient evidence of high attainments in scholarship and ability to carry on independent research in the special field in which the major work is done.

Major and Minor Subjects. The candidate must select a major and one or two closely related minor subjects. Thirty semester hours of minor work are required. The remainder of the required residence is devoted to intensive study and research in the major field. The amount of required course work in the major will vary with the subject and the individual candidate.

Thesis. The ability to do independent research must be shown by a dissertation on some topic connected with the major subject. The original typewritten copy of the thesis, bound in a special cover obtained at the book store, must be deposited in the office of the Dean at least three weeks before the time the degree is granted. One or two extra unbound copies should be provided for use of members of the examining committee prior to the date of the final examination. The theses are printed in such form as the committee and the Dean may approve and fifty copies are deposited in the library.

Final Examination. The final oral examination is held before a committee appointed by the Dean. One member of this committee is a representative of the Graduate Faculty who is not directly concerned with the student's graduate work. One or more members of the committee may be persons from other institutions, who are distinguished scholars in the student's major field.

The duration of the examination should be approximately three hours and should cover the research work of the candidate as embodied in his thesis, and his attainments in the fields of his major and minor subjects. The other detailed procedures are the same as those stated for the Master's examination.

RULES REGARDING CONDUCT OF LANGUAGE EXAMINATIONS FOR Ph.D. CANDIDATES

1. Candidates for the doctor's degree are expected to possess a reading knowledge of French and German. In the examination they will be expected to read at sight from books or articles in their specialty. It is not expected that the candidate knows every single word of the text and the examiners will supply occasional foreign terms; but it is presumed that the student knows sufficient grammar to recognize inflectional forms.

2. The student is asked to bring books or periodicals to the amount of about 400-500 pages to the examination from which the examiners will select a number of paragraphs for the reading test.

3. No penalty is attached to failure in the examination and the unsuccessful candidate is free to try again at the next date set for these tests.

4. Graduate students expecting to take the examination are asked to register their name in the Graduate Office at least three days prior to the test. *Examinations are held in the office of the Modern Language Department on the first Wednesdays in February, June, and October at 2 P. M.*

GRADUATE FEES

The fees paid by graduate students are as follows:

A matriculation fee of $10.00. This is paid once only, upon admission to the Graduate School.

A fixed charge, each semester at the rate of $1.50 per semester credit hour, with a minimum charge of $6.00.

A diploma fee of $10.00.

FELLOWSHIPS AND GRADUATE ASSISTANTSHIPS

A number of fellowships and graduate assistantships have been established by the University. A few industrial fellowships are also available in certain departments.

Applications for Fellowships and Graduate Assistantships. Application blanks are obtained at the office of the Dean of the Graduate School. All applications with the necessary credentials are sent by the applicant direct to the Dean not later than May 15. His endorsement assures the applicant of admission to the Graduate School in case he is awarded either a fellowship or a graduate assistantship. After the applications have been approved by the Dean they are sent to the heads of the departments concerned who make the selection and recommend to the proper administrative officer that the successful applicants be appointed. All of the applications together with the credentials are then returned to the office of the Dean of the Graduate School. Those of the successful applicants properly endorsed are placed on

file for record. The credentials will be returned to the unsuccessful applicants.

Stipend. The University fellowships pay $500 and the appointment is for the academic year. In certain cases the term of appointment may be extended to include one or two summer months in addition to the nine months of the academic year.

The stipend for the industrial fellowships varies according to the type of fellowship.

The stipend attached to the graduate assistantships is $1,000 per annum and the appointments are made for twelve months, with one month's vacation.

Service Requirements. Each University fellow is expected to give a limited portion of his time to instruction or perform equivalent duties prescribed by the major department. The usual maximum amount of service required is five hours per week of class-room work or twelve hours of laboratory and other prescribed duties. No service is required of the industrial fellow other than research. The teaching graduate assistants devote one-half of their time to instruction. This is equivalent to about one-half of the load of a full-time instructor. Several research assistantships are offered by the Experiment Station and the only service required is in connection with research projects. Graduate students holding appointments as fellows or graduate assistants are exempt from all fees except the diploma fee.

Residence Requirements for a Degree. Fellows may satisfy the residence requirements for either the Master's or Doctor's degree without extension of the usual time.

The Graduate Assistants are required to spend two years in residence for the Master's degree, but for the Doctor's degree they are allowed two-thirds residence credit for each academic year at this University so that the minimum residence requirement from the Bachelor's degree may be satisfied in four academic years and one summer or three academic years and three summers of 11 to 12 weeks.

DESCRIPTION OF COURSES

For the convenience of students in making out schedules of studies, the subjects in the following Description of Courses are arranged alphabetically:

AGRICULTURAL ECONOMICS

Courses for Graduates and Advanced Undergraduates

A. E. 101 s. *Transportation of Farm Products* (3)—Three lectures.

A study of the development of transportation in the United States, the different agencies for transporting farm products, with special attention to such problems as tariffs, rate structure, and the development of fast freight lines, refrigerator service, etc. (Bennett.)

A. E. 102 s. *Marketing of Farm Products* (3)—Three lectures. Prerequisite, Econ. 3 s.

A complete analysis of the present system of transporting, storing, and distributing farm products and a basis for intelligent direction of effort in increasing the efficiency of marketing methods. (DeVault.)

A. E. 103 f. *Co-operation in Agriculture* (3)—Three lectures. Prerequisite, Econ. 3 s.

Historical and comparative development of farmers' co-operative organizations; reasons for failure and essentials to success; present tendencies. (Bennett.)

A. E. 104 s. *Agricultural Finance* (3)—Three lectures. *Agricultural Credit* requirements; institutions financing agriculture; financing specific farm organizations and industries. *Taxation* of various farm properties; burden of taxation on different industries; methods of taxation; proposals for tax reform. *Farm Insurance*—fire, crop, livestock, and life insurance—how provided, benefits, and needed extension. (Given in 1929-1930.) (Bennett.)

A. E. 105 y. *Seminar* (1-3).

This course will consist of special reports by students on current economic subjects, and a discussion and criticism of the same by the members of the class and the instructor. (DeVault.)

A. E. 106 y. *Research Problems* (1-3).

With the permission of the instructor, students will work on any research problems in agricultural economics which they may choose, or a special list of subjects will be made up from which the students may select their research problems. There will be occasional class meetings for the purpose of making reports on progress of work, methods of approach, etc. (DeVault.)

Courses For Graduates

A. E. 201 y. *Special Problems in Agricultural Economics* (3).

An advanced course dealing more extensively with some of the economic problems affecting the farmer; such as land problems, agricultural finance, farm wealth, agricultural prices, transportation, and special problems in marketing and co-operation. (DeVault.)

A. E. 202 y. *Research and Thesis* (8)—Students will be assigned research work in Agricultural Economics under the supervision of the instructor. The work will consist of original investigation in problems of Agricultural Economics, and the results will be presented in the form of a thesis. (DeVault.)

AGRICULTURAL EDUCATION AND RURAL LIFE

Courses for Graduates and Advanced Undergraduates

AG. ED. 100 s. *Survey of Teaching Methods for Agricultural Students* (3)—Two lectures; one laboratory. Open to Juniors and Seniors; required of Juniors in Agricultural Education. Prerequisite, Ed. 101. Cannot be counted toward major for advanced degree in Agricultural Education.

The nature of educational objectives, the class period, steps of the lesson plan, observation and critiques, type lessons, lesson planning, class management. (Cotterman.)

AG. ED. 101 y. *Teaching Secondary Vocational Agriculture* (8)—Three lectures; one laboratory the first semester. One seminar period and practicum work to be arranged the second semester. Practicum work may be arranged during the first semester. Prerequisites, Ag. Ed. 100; A. H. 1, 2; Dairy 1; Poultry 1; Soils 1; Agronomy 1, 2; Hort 1, 11; F. Mech. 101, 104; A. E. 1; F. M. 2. Cannot be counted toward major for advanced degree in Agricultural Education.

Types of schools and classes; administrative programs; qualifications of teachers; day class instruction—objectives, selection of projects, project instruction, selection of content for group instruction, methods of class period; evening class instruction; part-time class instruction; equipment and other administrative problems; unit courses; student projects; investigations; reports. (Cotterman.)

AG. ED. 102 s. *Rural Life and Education* (3)—Three lectures.

Ancient and foreign rural communities; evolution of American rural communities; rural social institutions; social and cultural measurements, standards of living; the analysis of rural communities; community and educational programs; problems in leadership; investigations; reports. This course is designed especially for persons who expect to be called upon to assist in shaping educational and other community programs for rural people. (Cotterman.)

AG. ED. 103 s. *Objectives and Methods in Extension Education* (2-3)—Two lectures.

Given under the supervision of the Extension Service, and designed to equip young men to enter the broad field of extension work. Methods of assembling and disseminating the agricultural information available for the practical farmer; administration, organization, supervision, and practical details connected with the work of a successful county agent, with club work and the duties of an extension specialist. Students will be required to gain experience under the guidance of men experienced in the respective fields. Traveling expenses for this course will be adjusted according to circumstances, the ability of the man, and the service rendered. (Cotterman and Extension Specialists.)

AG. ED. 104 s. *Teaching Farm Shop in Secondary Schools* (1)—One lecture.

Objectives in the teaching of farm shop; contemporary developments; determination of projects; shop management; shop programs; methods of

teaching; equipment; materials of instruction; special projects. (Carpenter.)

AG. ED. 105 f. *School and Rural Community Surveys* (2-5)—Credits determined by amount and character of work done. Two lectures.

The function of survey; typical surveys, their purposes and findings; types of surveys; sources of information; preparation of schedules; collection, tabulation, and interpretation of data. (Cotterman.)

Courses For Graduates

AG. ED. 201 S. *Special Problems in the Teaching of Vocational Agriculture* (3)—Summer Session only. Prerequisite, Ag. Ed. 101.

Analysis of the work of the supervisor; supervisory programs; policies; problems; contemporary developments; principles of supervision; investigations; reports. (Cotterman.)

AG. ED. 202 S. *Supervision of Vocational Agriculture* (3)—Summer Session only. Prerequisite, Ag. Ed. 101.

Analysis of the work of the supervisor; supervisory programs; policies; problems; contemporary developments; principles of supervision; investigations; reports. (Cotterman.)

AG. ED. 204 s. *Seminar in Agricultural Education* (3).

Problems in the administration and organization of Agricultural Education—prevocational, secondary, collegiate, and extension; individual problems and papers; current literature. (Cotterman.)

ED. 202 f. *College Teaching* (3).

ED. 203 .s. *Problems in Higher Education* (3).

(See Courses under Education, page 31.)

AGRONOMY

Division Crops

Courses for Graduates and Advanced Undergraduates

AGRON. 103 f. *Crop Breeding* (2)—One lecture; one laboratory. Prerequisite, Gen. 101.

The principles of breeding as applied to field crops and methods used in crop improvement. (Kemp.)

AGRON. 120 s. *Cropping Systems and Methods* (2)—Two lectures. Prerequisites, Agron. 1 and Soils 1.

Principles and factors influencing cropping systems in the United States; study of rotation experiments; theories of cropping methods; and practice in arranging type farming systems. (Metzger.)

AGRON. 121 s. *Methods of Crop and Soil Investigations* (2)—One lecture; one laboratory.

A consideration of crop investigation methods at the various experiment stations, and the standardization of such methods. (Not offered in 1929-1930.) (Metzger.)

Courses For Graduates

AGRON 201 y. *Crop Breeding*—credits determined by work accomplished. The content of this course is similar to that of Agron 103, but will be adapted more to graduate students, and more of a range will be allowed in choice of material to suit special cases. (Kemp.)

AGRON. 203 y. *Seminar* (2)—One report period each week.

The seminar is devoted largely to reports by students on current scientific publications dealing with problems in crops and soils.

AGRON. 209 y. *Research*—Credits determined by work accomplished.

With the approval of the head of the department the student will be allowed to work on any problem in agronomy, or he will be given a list of suggested problems from which he may make a selection. (Staff.)

DIVISION OF SOILS

Courses for Graduates and Advanced Undergraduates

SOILS 104 s. *Soil Micro-Biology* (3)—Two lectures; one laboratory. Prerequisite, Bact. 1.

A study of the micro-organisms of the soil in relation to fertility. It includes the study of the bacteria of the soil concerned in the decomposition of organic matter, nitrogen fixation, nitrification, and sulphur oxidation and reduction, and deals also with such organisms as fungi, algæ, and protozoa.

This course includes a critical study of the methods used by Experiment Stations in soil investigational work. (Thomas.)

Courses For Graduates

SOILS 201 y. *Special Problems and Research* (10-12).

Original investigation of problems in soils and fertilizers. (Staff.)

SOILS 202 y. *Soil Technology* (7-5 f, 2 s)—Two lectures; two laboratories first semester; two lectures; one laboratory second semester. Prerequisites, Geology 1, Soils 1, and Chemistry 1.

In the first semester chemical and physico-chemical study of soil problems as encountered in field, greenhouse, and laboratory. In the second semester physical and plant nutritional problems related to the soil. (Thomas.)

ANIMAL HUSBANDRY

Courses for Graduates and Advanced Undergraduates

A. H. 101 s. *Nutrition* (3)—Two lectures; one laboratory. Senior year.

A study of digestion, assimilation, metabolism, and protein and energy requirements. Methods of investigation and studies in the utilization of feed and nutrients. (Meade.)

A. H 102 y. *Seminar* (2)—One lecture. Senior and graduate students only. Students are required to prepare papers based upon current scientific publications relating to animal husbandry or upon their research work for presentation before and discussion by the class. (Staff.)

Courses For Graduates

A. H. 201 y. *Research*—Credit to be determined by the amount and character of work done. With the approval of the head of the department, students will be required to pursue original research in some phase of animal husbandry, carry the same to completion, and report the results in the form of a thesis. (Staff.)

BACTERIOLOGY

Courses for Graduates and Advanced Undergraduates

BACT. 101 y. *Dairy Bacteriology* (6)—One lecture; two laboratories. Juniors. Prerequisite, Bact. 1.

Historical sketch; relation of bacteria to dairy products; preparation of media; plating by dilution method; direct microscopic examination; kinds of bacteria in milk, and their development; pasteurization, by flash and hold methods; sources of contamination of milk; care of milk; abnormal milks; tests, and their relation to bacteria counts; fermented milks; bacteriological analysis of standard grades of milk and milk products; preparation of starters; requirements and standards for various grades of milk; public health requirements. (Poelma.)

BACT. 102 y. *Advanced Bacteriology* (3-10)—Juniors and Seniors. Prerequisite, Bact. 1.

This course is intended primarily to give the student a chance to develop his own initiative. He will be allowed to decide upon his project and work it out as much as possible in his own way under proper supervision. In this manner he will be able to apply his knowledge of bacteriology to a given problem in that particular field in which he is interested. He will get to know something of the methods of research. Familiarity with library practices and current literature will be included. (Pickens.)

BACT. 103 s. *Hematology* (2)—Senior year. Prerequisite, Bact. 1.

Procuring blood; estimating the amount of hemoglobin; color index; examination of red cells and leucocytes in fresh and stained preparations; numerical count of erythrocytes and leucocytes; differential count of leucocytes; sources and development of the formed elements of blood; pathological forms and counts. (Straka.)

BACT. 104 f. *Serology* (2-3)—Junior or Senior year. Prerequisite, Bact. 2.

The theory and application of several serological tests, including the Compliment Fixation Reaction. (Poelma.)

BACT. 105 f. *Pathological Technique* (3)—Junior or Senior year. Prerequisite, Bact. 1.

Examination of fresh material; free hand sections; fixation; frozen sections; decalcification; celloidin and parrafin imbedding processes; sectioning; general and special standing processes. (Reed.)

BACT. 106 f. *Comparative Anatomy and Physiology* (3)—Three lectures. Junior year.

Structure of the animal body; abnormal as contrasted with normal. The interrelationship between the various organs and parts as to structure and function. (Reed.)

BACT. 107 s. *Urinalysis* (2)—Junior or Senior year. Prerequisite, Bact. 1, (Reed.)

BACT. 108 s. *Animal Hygiene* (3)—Three lectures or demonstrations, Senior year.

Care and management of domestic animals, with special reference to maintenance of health and resistance to disease. Prevention and early recognition of disease; general hygiene; sanitation; first aid. (Reed.)

BACT. 109 y. *Thesis* (4)—Senior year. Prerequisites, Bact. 1 and at least one of the advanced courses.

Investigation of given project, results of which are to be presented in the form of a thesis and submitted for credit toward graduation. (Pickens.)

BACT. 110 y. *Seminar* (2)—Senior year.

The work will consist of making reports on individual projects and on recent scientific literature. (Pickens and Staff.)

BACT. 111 s. *Public Health* (1)—One lecture. Junior or Senior year. Prerequisite, Bact. 1.

A series of weekly lectures on Public Health and its Administration, by the Experts of the Maryland State Board of Health. (Pickens, In Charge.)

Courses For Graduates

BACT. 201 y. *Research Bacteriology* (4-12)—Prerequisites, Bact. 1 and in certain cases, Bact. 103, depending upon the project. (Pickens.)

BACT. 202 y. *Research in Genital Diseases of Farm Animals.* Prerequisite,Degree in Veterinary Medicine, from an approved Veterinary College. Laboratory and field work by assignment. (Reed.)

BOTANY

(For other Botanical Courses see Plant Physiology and Plant Pathology.)

Courses For Graduates and Advanced Undergraduates

BOT. 101 f. *Plant Anatomy* (3)—One lecture; two laboratories. Not offered in 1930-1931.

A study of the structures of roots, stems, leaves, flowers, and fruits; the origin and development of organs and tissue systems in vascular plants. (Temple.)

BOT. 102 s. *Methods in Plant Histology* (3)—One lecture; two laboratories. Prerequisite, Bot. 1. Not offered in 1929-1930.

Primarily a study in technique. It includes methods of the killing, fixing, imbedding, sectioning, staining, and mounting of plant materials. (Temple.)

BOT. 103 f or s. *Advanced Taxonomy* (3)—One lecture; two laboratories. Prerequisite, Bot. 1. Not offered in 1930-1931.

This course is offered for students who want more proficiency in systematic botany than the elementary course affords. A student who completes the course should be able to classify the grasses and other common plants of the state. (Norton.)

BOT. 105 s. *Economic Plants* (2)—One lecture; one laboratory. Not offered in 1929-1930.

The names, taxonomic position, native and commercial geographic distribution, and use of the leading economic plants of the world are studied. By examination of plant products in markets, stores, factories, and gardens, students become familiar with the useful plants both in the natural form and as used by man. (Norton.)

BOT. 106 f. *History and Philosophy of Botany* (1)—One lecture. Not offered in 1930-1931.

Discussion of the development of the ideas and knowledge about plants. (Norton.)

Courses For Graduates

BOT. 202. *Special Studies of Fungi*—Credit hours according to work done. Prerequisite, Bot. 103.

Special problems in the structure or life history of fungi or the monographic study of some group of fungi.

BOT. 203. *Special Plant Taxonomy*—Credit hours according to work done. Prerequisite, Bot. 103.

Original studies in the taxonomy of some group of plants.

CHEMISTRY

A. General Chemistry

Courses for Graduates and Advanced Undergraduates

CHEM. 100 y. *Advanced Inorganic Chemistry* (6)—Two lectures; one laboratory. Prerequisite, Chem. 6 y.

A study of the rarer elements is made by comparing their properties with those of the more common elements. The course is based upon the periodic system, the electromotive series, and the electronic structure of matter. The laboratory is devoted to the preparation of pure, inorganic substances. (White.)

Courses For Graduates

CHEM. 201 y. *Research in Inorganic Chemistry* (12)—Open to students working for the higher degrees. Prerequisite, a bachelor's degree in chemistry or its equivalent. (White.)

B. Analytical Chemistry

Courses for Graduates and Advanced Undergraduates

CHEM. 101 y. *Advanced Quantitative Analysis* (10)—Two lectures. Three laboratories each semester.

A broad survey of the field of inorganic quantitative analysis. In the first semester mineral analysis will be given. Included in this will be analysis of silicates, carbonates, etc. In the second semester the analysis of steel and iron will be taken up. However, the student will be given wide latitude as to the type of quantitative analysis he wishes to pursue during the second semester. Prerequisite, Chem. 6 or its equivalent. (Wiley.)

Courses For Graduates

CHEM. 202 y. *Research in Quantitative Analysis* (12)—Open to students working for the higher degrees. Prerequisite, a bachelor's degree in chemistry or its equivalent. (Wiley.)

C. Organic Chemistry

Courses for Graduates and Advanced Undergraduates

CHEM. 116 y. *Advanced Organic Chemistry* (8)—Two lectures; two laboratories. Prerequisite, Chem. 8 f or s or its equivalent.

This course is devoted to a more advanced study of the compounds of carbon than is undertaken in Chem. 8 f. or s. The laboratory work includes quantitative determinations of the halogens, nitrogen, carbon and hydrogen in organic substances, and also preparation work more difficult than that encountered in the elementary course. Required of students specializing in chemistry. Course 116 y may be taken without the laboratory work. (Drake.)

Courses For Graduates

CHEM. 203 f or s. *Special Topics in Organic Chemistry* (2)—A lecture course which will be given any half year when there is sufficient demand. The course will be devoted to an advanced study of topics which are too specialized to be considered in Chem. 116 y. Topics that may be covered are dyes, drugs, carbohydrates, plant pigments, etc. The subject matter will be varied to best suit the needs of the particular group enrolled.

CHEM. 205 f or s. *Organic Preparations* (4)—A laboratory course, devoted to the synthesis of various organic compounds. This course is designed to fit the needs of those students whose laboratory experience has been insufficient for research in organic chemistry.

CHEM. 210. *Research in Organic Chemistry* (12)—Open to students working for the higher degrees. Prerequisite, a bachelor's degree in chemistry or its equivalent. (Drake.)

D. Physical Chemistry

Courses For Graduates and Advanced Undergraduates

CHEM. 102 y. *Physical Chemistry* (10)—Three lectures; two laboratory periods. Prerequisites, Chem. 6 y; Physics 2 y; Math. 6 s. One term may be taken for graduate credit.

This course aims to furnish the student with a thorough background in the laws and theories of chemistry. The gas laws, kinetic theory, liquids, solutions, elementary thermodynamics, thermochemistry, equilibrium, chemical kinetics, etc. (Haring.)

Courses For Graduates

Note: CHEM. 102 y or its equivalent is prerequisite for all advanced courses in physical chemistry.

CHEM. 212 y. *Colloid Chemistry* (8 or 4)—Two lectures; two laboratory periods: or two lectures only.

This is a thorough course in the chemistry of matter associated with surface energy. (Haring.)

CHEM. 213 f. *Phase Rule* (2)—Two lectures. (Not given 1929-1930.)

A systematic study of heterogeneous equilibria. One, two and three component systems will be considered with practical applications of each. (Haring.)

CHEM. 214 s. *Structure of Matter* (2)—Two lectures. (Not given 1929-1930.)

Subjects considered will be radioactivity, isotopes, the Bohr and Lewis-Langmuir theories of atomic structure, and allied topics. (Haring.)

CHEM. 215 f. *Catalysis* (2)—Two lectures. (Not given 1929-1930.)

This course consists of lectures on the theory and applications of catalysis. (Haring.)

CHEM. 216 s. *Theory of Solutions* (2)—Two lectures. (Not given 1929-1930.)

A detailed study will be made of the modern theory of ideal solutions, of the theory of electrolytic dissociation and of the recent developments of the latter. (Haring.)

CHEM. 217 y. *Electrochemistry* (8 or 4)—Two lectures; two laboratory periods or two lectures only. (Not given 1929-1930.)

A study of the principles and some of the practical applications of electrochemistry. (Haring.)

CHEM. 218 y. *Chemical Thermodynamics* (4)—Two lectures.

A study of the methods of approaching chemical problems through the laws of energy. It is mathematical in character.

CHEM. 219 y. *Research in Physical Chemistry* (12)—Open to students working for the higher degrees. Prerequisite, a bachelor's degree in chemistry or its equivalent. Consent of the instructor. (Haring.)

E. Agricultural Chemistry

Courses For Graduates and Advanced Undergraduates

CHEM. 104 f or s. *General Physiological Chemistry* (4)—Two lectures; two laboratories. Prerequisite, Chem. 12 f or its equivalent.

A study of the chemistry of the fats, carbohydrates, proteins, and other compounds of biological importance. This course is intended for students

majoring in biological subjects, and as a prerequisite to certain advanced courses in this department. (Broughton.)

CHEM. 106 f or s. *Dairy Chemistry* (4)—One lecture; three laboratories. Prerequisite, Chem. 12 f.

Lectures and assigned reading on the constituents of dairy products. This course is designed to give the student a working knowledge and laboratory practice in dairy chemistry and analysis. Practice is given in examining dairy products for confirmation under the food laws, detection of watering, detection of preservatives and added colors, and the detection of adulterants. Students showing sufficinet progress may take the second semester's work, and elect to isolate ana make complete analysis of the fat or protein of milk. (Broughton.)

CHEM. 108 s. *Chemistry of Nutrition* (4)—Two lectures; two laboratories. Prerequisite, Agricultural Chemistry 104 f or its equivalent.

Lectures on the chemistry of nutrition, laboratory determination of fuel value of food and the heat production of man under various conditions, metabolism, the effects on small animals of diets consisting of purified food constituents, and the effects of selected diets on the formation of waste products in the body. (Broughton.)

CHEM. 115 f or s. *Organic Analysis* (4)—One lecture; three laboratories. Prerequisite, Chem. 6 y and 8 y.

This course gives a connected introductory training in organic analysis, especially as applied to plant and animal substances and their manufactured products. The greater part of the course is devoted to quantitative methods for food materials and related substances. Standard works and the publications of the Association of the Official Agricultural Chemists are used freely as references. (Broughton.)

Courses For Graduates

CHEM. 220 f or s. *Special Problems* (4 to 8)—A total of eight credit hours may be obtained in this course by continuing the course for two semesters. Laboratory, library, and conference work amounting to ten hours each week. Prerequisites, Chem. 104 f and consent of instructor.

This course consists of studies of special methods such as the separation of the fatty acids from a selected fat, the preparation of certain carbohydrates or amino acids, and the determination of the distribution of nitrogen in a protein. The students will choose, with the advice of the instructor, the particular problem to be studied. (Broughton.)

CHEM. 221 f or s. *Tissue Analysis* (3)—Three laboratories. Prerequisite, Chem. 12 f or its equivalent.

A discussion and the application of the analytical methods used in determining the inorganic and organic constituents of live tissue. (Broughton.)

CHEM. 224 f or s. *Research* (5 to 10)—Agricultural chemical problems will be assigned to graduate students who wish to gain an advanced degree. (Broughton.)

F. Industrial Chemistry

Courses For Graduates and Advanced Undergraduates

CHEM. 110 y. *Industrial Chemistry* (6)—Three lectures. Prerequisites, Chem. 6 y and 8 y.

A study of the principal chemical industries; factory inspection, trips, and reports; the preparation of a thesis on some subject of importance in the chemical industries.

CHEM. 111 y. *Engineering Chemistry* (2)—One lecture. A course for engineering students.

A study of water, fuels and combustion, the chemistry of engineering materials, etc. Problems typical of engineering work.

CHEM. 112 f. *Gas Analysis* (4)—One lecture; three laboratories. Prerequisite, Chem. 6 y.

An experimental study of the methods of determining quantitatively the common gases. Flue gas analysis and its significance.

Courses For Graduates

CHEM. 222. *Unit Processes of Chemical Engineering* (3)—Three lectures. Prerequisite, consent of instructor.

A theoretical discussion of evaporation, distillation, filtration, etc. Problems.

CHEM. 223 y. *Research in Industrial Chemistry.* The investigation of special problems and the preparation of a thesis toward an advanced degree.

G. Chemistry Seminar

CHEM. 226 y. *Chemistry Seminar* (2)—Required of *all* graduate students in chemistry. The students are required to prepare reports of papers in the current literature. These are discussed in connection with the recent advances in the subject. (The Chemistry Staff.)

DAIRY HUSBANDRY

Courses For Graduates and Advanced Undergraduates

D. H. 101 s. *Advanced Breed Study* (2)—One lecture; one laboratory. Breed Association rules and regulations, important families and individuals, pedigree studies. Work largely by assignment. (Ingham.)

D. H. 102 s. *Advanced Dairy Manufacturing* (3)—Hours to be arranged as to lecture and laboratory. Prerequisites, D. H. 4. (Not offered in 1929-1930.)

Plant and laboratory management, storage problems. Study of costs of production, accounting systems, purchase of equipment and supplies, market conditions, relation of the manufacturer to the shipper and dealer.

In this course the student will be required to act as helper and foreman and will be given an opportunity to participate in the general management

of the dairy plant. Visits will be made to nearby dairies and ice-cream establishments. (Munkwitz.)

D. H. 103 y. *Seminar* (2)—Students are required to prepare papers based upon current scientific publications relating to dairying or upon their research work for presentation before and discussion by the class. (Staff.)

Courses For Graduates

D. H. 201 y. *Research.* Credit to be determined by the amount and quality of work done. Students will be required to pursue, with the approval of the head of the department, an original investigation in some phase of dairy husbandry, carry the same to completion, and report the results in the form of a thesis. (Staff.)

ECONOMICS AND SOCIOLOGY

A. Economics

Courses For Graduates and Advanced Undergraduates

ECON. 101 f. *Money and Credit* (2)—Two lectures. Prerequisite, Econ. 3 f or s.

A study of the origin, nature, and functions of money, monetary systems, credit and credit instruments, prices, interest rates, and exchanges. (Cadisch.)

ECON. 102 s. *Banking* (2)—Two lectures. Prerequisite, Econ. 3 f or s. (Should be preceded by Econ. 101 f.)

Principles and practice of banking in relation to business, commercial banking, trust companies, savings banks, agricultural financial organizations, Federal Reserve system. (Cadisch.)

ECON. 103 f. *Investments* (3)—Three lectures. Prerequisite, Econ. 3 f or s.

Classes of securities, stocks and bonds, railroad, public utility, real estate securities, government, state, and municipal bonds, stock and bond houses, taxation of investments. (Cadisch.)

ECON. 104 f. *Public Finance* (2)—Two lectures. Prerequisite, Econ. 3 f or s.

The nature of public expenditures, sources of revenue, the principles of taxation, an examination of types of taxes to determine their effects upon the individual and the community. Federal taxation in the United States, public credit, national debt, and budget of the United States. (Daniels.)

ECON. 105 f. *Business Organization and Operation* (2)—Two lectures. Prerequisite, Econ. 3 f or s.

An introductory course dealing with the fundamental principles of business organization and management. The evolution of management, forms of business enterprises, administration, types of internal organization, planning, purchasing, and personnel problems. Emphasis is placed upon the application of scientific methods in the solution of business problems. (Dodder.)

ECON. 106 s. *Corporation Finance* (2)—Two lectures. Prerequisite, Econ. 3 f or s. (Should be preceded by Econ. 105 f.)

Principles of financing, the corporate form and its status before the law, owned and borrowed capital, basis of capitalization, sources of capital funds, sinking funds, distribution of surplus, corporation failures, reorganizations, receiverships, and holding companies. (Dodder.)

ECON. 107 f. *Business Law* (3)—Three lectures.

The aim of this course is to train students for practical business affairs, giving the legal information necessary to an understanding of the rights and liabilities involved in business transactions. Some phases of the work are requisites and forms of contracts and remedies for their breach; negotiable instruments, agency, partnership, corporations, real and personal property, sales, mortgages, and insurance. (Carpenter.)

ECON. 108 s. *Business Law* (3)—Three lectures (continuation of Econ. 107 f.) Prerequisite, Econ. 107 f. (Carpenter.)

ECON. 109 y. *General Accountancy* (6)—Two lectures; one laboratory.

This course has three aims; namely, to give the prospective business man an idea of accounting as a means of control, to give him a working knowledge of accounting fundamentals, and to serve as a basic course for advanced and special accounting. Theory of debits and credits, ledger, special journals, trial balance, work sheets, statements, control accounts, adjustment and closing entries. Change of partnership form to corporation. Voucher systems, statements, and special accounts peculiar to corporation accounting. (Dodder.) (Only partial credit for graduate students.)

ECON. 110 y. *Advanced Accountancy* (6)—Two lectures; one laboratory. Prerequisite, Econ. 109 y.

Theory of asset and liability accounts. Agency and branch accounting, consignments, venture accounts, and working paper operation. Correction of statements, special phases of corporation accounts such as capital stock, stock subscriptions, unearned income, surplus, good-will, fixed assets, depreciation, contingent liabilities, and mergers. Introduction of accounting systems for manufacturing, mercantile, and other institutions. (Dodder.)

ECON. 111 s. *Railway Transportation* (3)—Three lectures. Prerequisite, Econ. 3 f or s.

Development of the railway net of the United States; railroad finance and organization; problems of railway maintenance and method of conducting transportation; theory of railway rates; personal and local discrimination; geographical location and market competition; railway agreements; regulation by State and Federal governments; recent legislation. (Daniels.)

ECON. 112 s. *Public Utilities* (2)—Two lectures. Prerequisite, Econ. 3 f or s. (Alternate years, offered in 1929-1930.)

An examination of the fundamental basis for the concept of certain forms of business as peculiarly essential to the public welfare. Problems of rates, management, and finance of corporations engaged in supplying

electricity, gas, street railway, telegraph and telephone service to the public. Government regulation and supervision of rates and finance. (Daniels.)

ECON. 113 s. *Life Insurance* (2)—Two lectures. Prerequisites, Econ. 3 f or s. (Alternate years, offered in 1930-1931.)

Nature and use of life insurance, classification of policies, mortality tables, calculation of premiums, reserves, and dividends, loading, fraternal, assessment, industrial, disability and group insurance. (Cadisch.)

ECON. 114 s. *Property Insurance* (2)—Two lectures. Prerequisite, Econ. 3 f or s. (Alternate years, offered in 1929-1930.)

Fire, marine, automobile, and miscellaneous forms of property insurance. Rates, reserves, underwriters, agencies and brokers, reinsurance. (Cadisch.)

ECON. 115 y. *History of Economic Theory* (4)—Two lectures. Prerequisite, Econ. 3 f or s. Senior standing.

History of economic doctrines and theories from the eighteenth century to the modern period with special reference to the theories of value and distribution. (Cadisch.)

ECON. 116 s. *Foreign Trade* (2)—Two lectures. Prerequisites, Econ. 1 f and Econ. 3 f. (Alternate years, offered in 1930-1931.)

A study of various business methods in foreign countries. Major differences between the conduct of domestic and foreign commerce. Survey of practices generally adopted in international shipping, banking, and trading. (Daniels.)

ECON. 117 f. *Marketing Organization and Administration* (3)—Three lectures. Prerequisite, Econ. 3 f. (Alternate years, offered in 1930-1931.)

Marketing structure and functions from an administrative point of view. Marketing problems and methods of the manufacturer, jobber, selling agent, retailer, chain store, and mail order executive. Merchandizing, stock control, salesmanship, advertising and sales management, wholesale and retail credits and collections, market analysis, and marketing policies. (Dodder.)

ECON. 118 s. *Marketing Organization and Administration* (3)—Three lectures. Prerequisite, Econ, 117 f. Continuation of Econ. 117 f. (Alternate years, offered in 1930-1931.) (Dodder.)

Courses For Graduates

ECON. 201 y. *Thesis* (4-6)—Graduate standing. (Members of the staff.)

B. Sociology

Courses For Graduates and Advanced Undergraduates

SOC. 101 y. *Social Problems and Institutions* (4)—Two lectures. Prerequisite, Soc. 2 f.

Individual and group mal-adjustment, causative factors, social complications; techniques in social restoration; public and private organizations administering social treatment; the development of social work. Visits to

some of the major social agencies are to be correlated with the classroom work. (Bellman.)

Soc. 102 f. *Labor Problems* (2)—Two lectures.

The social function of industry; existing relations between employer, employee, and consumer; labor problems as types of social mal-adjustment; factors in causation; present and proposed approaches to industrial equilibrium. (Bellman.)

Soc. 103 s. *History of Social Theory* (3)—Three lectures. Prerequisite, Soc. 2 f.

A survey of man's attempt to understand, explain, and control social organization. The origin of Sociology and its present progress toward becoming the science of human relationships. (Bellman.)

(See Education, Agricultural Education and Rural Life.)

EDUCATION

A. History and Principles

Courses for Graduates and Advanced Undergraduates

Ed. 101 f. *Educational Psychology* (3)—Open to Juniors and Seniors. Required of all Juniors in Education.

General characteristics and use of original tendencies; principles of mental development; the laws and methods of learning; experiments in rate of improvement; permanence and efficiency; causes and nature of individual differences; principles underlying mental tests; principles which should govern school practices. (Sprowls.)

Ed. 102 s. *Technic of Teaching* (3)—Three lectures; one laboratory. Required of Juniors in Education. Prerequisite, Ed. 101 f.

The nature of educational objectives; steps of the lesson plan; observation and critiques; survey of teaching methods; type lessons; lesson planning; class management. (Long.)

Ed. 103 s. *Principles of Secondary Education* (3)—Required of all Seniors in Education. Prerequisites, Ed. 101 f, Ed. 102 s, and full Senior standing.

Evolution of secondary education; articulation of the secondary school with the elementary school, college, and technical school, and with the community and the home; the junior high school; programs of study and the reconstruction of curricula; teaching staff; student activities. (Small.)

Ed. 104 f. *History of Education* (3)—Senior Elective.

History of the evolution of educational theory, institutions, and practices. Emphasis is upon the modern period. (Small.)

Ed. 105 f. *Educational Sociology* (3)—Three lectures. Not given in 1929-1930.

The sociological foundations of education; the major educational objectives; the function of educational institutions; the program of studies; objectives of the school subjects; group needs and demands; methods of determining educational objectives. (Cotterman.)

Ed. 106 s. *Advanced Educational Psychology* (3)—Prerequisites, Ed. 101 f and Ed. 102 s. The latter may be taken concurrently with Ed. 106 s.

Principles of genetic psychology; nature and development of the human organism; development and control of instincts. Methods of testing intelligence; group and individual differences and their relations to educational practice. Methods of measuring rate of learning; study of typical learning experiments. (Sprowls.)

Ed. 107 f. *Educational Measurements* (3)—Prerequisites, Ed.. 101 f and Ed. 102 s.

A study of typical educational problems involving educational scales and standard tests. Nature of tests, methods of use, analysis of results and practical applications in educational procedure. Emphasis will be upon tests for high school subjects. (Sprowls.)

Ed. 108 s. *Mental Hygiene* (3)—Prerequisite, Ed. 101 f or Psychol. 1 f or s or equivalent.

Normal tendencies in the development of character and personality. Overcoming problems of adjustment to school and society; obsessions, fears, compulsions, conflicts, inhibitions, and compensations. Methods of personality analysis. (Sprowls.)

Ed. 109 y. *Child Development* (4)—Seniors and graduate students. Prerequisite, H. Ec. Ed. 102 f or equivalent.

A survey of existent knowledge of the physiological, psychological and psychiatric development of children. This course is given at the Washington Child Research Center, Tuesday and Thursday at 4 P. M. (Sherman.)

Ag. Ed. 102 s. *Rural Life and Education.*

Ag. Ed. 105 f. *School and Rural Community Surveys.*
(See Agricultural Education.)

B. Methods in Arts and Science Subjects (High School)

Ed. 110 y. *English in Secondary Schools* (6)—Special methods and supervised teaching. Required of seniors preparing to teach English. Prerequisites, Ed. 101 f and 102 s.

Objectives in English in the different types of secondary schools; selection of subject matter; State requirements; interpretation of the State Course of Study in terms of modern practice and group needs; organization of materials; lesson plans; measuring results; observations; class teaching; critiques. (Smith.)

Ed. 111 y. *History and Civics in Secondary Schools* (6)—Special methods and supervised teaching. Required of Seniors preparing to teach history. Prerequisites, Ed. 101 f and 102 s; H 1 y and H 2 y.

Objectives of history and civics in secondary schools; selection of subject matter; parallel reading; State requirements and State courses of study; the development of civics from the community point of view; reference books, maps, charts, and other auxiliary materials; the organization of materials; lesson plans, measuring results; observations; class teaching; critiques. (Long.)

Ed. 112 y. *Foreign Language in Secondary Schools* (6)—Special methods and supervised teaching. Required of Seniors preparing to teach foreign language. Prerequisites, Ed. 101 f and 102 s.

Objectives of foreign language in secondary schools; selection of subject matter; State requirements and State courses of study; the organization of material for teaching; lesson plans; special devices and auxiliary materials; observation; class teaching; critiques. (Rosasco.)

Ed. 113 y. *Mathematics in Secondary Schools* (6)—Special methods and supervised teaching. Required of Seniors preparing to teach mathematics. Prerequisites, Ed. 101 f and 102 s.

Objectives of mathematics in secondary schools; historic retrospect; selection of subject matter; State requirements and State courses of study; proposed reorganizations; lesson plans; textbooks and supplementary materials; measuring results; standard tests; observations; class teaching; critiques. (Brechbill.)

Ed. 114 y. *Science in Secondary Schools* (6)—Special methods and supervised teaching. Required of Seniors preparing to teach science. Prerequisites, Ed. 101 f and 102 s.

Objectives of science in secondary schools; historic retrospect; selection of subject matter; State requirements and State courses of study; textbooks, reference works, and other sources of materials; the organization of materials for instruction; methods of the class period; lesson plans; organization of laboratory instruction; notebooks; measuring results; standard tests; observation; class teaching; critiques. (Brechbill.)

Courses for Graduates

Ed. 201 y. *Seminar in Education* (6)—(The course is organized in semester units.)

Problems in educational organization and administration. Study of current literature; individual problems. (Small.)

Ed. 202 f. *College Teaching* (3)—One seminar period.

Analysis of the work of the college teacher; objectives; nature of subject matter; nature of learning; characteristics of college students; methods of college teachers; measuring results; extra-course duties; problems; investigations; reports. (Cotterman.)

Ed. 203 s. *Problems in Higher Education* (3)—One double period a week. Lectures, surveys, and individual reports. Prerequisite, Ed. 202 f.

American collegiate education; status of the college teacher; collegiate education in foreign countries; demands upon institutions of higher learning; tendencies in the reorganization of collegiate education; curriculum problems; equipment for teaching. (Cotterman.)

Ed. 204 s. *Chemical Education* (2)—Two lectures. Open to graduate students whose major is chemistry. Prerequisites, Ed. 101 f and Ed. 202 f.

Recent developments in the field of chemical education methods, laboratory design, equipment, etc. Required of all students qualifying for college chemistry teaching. Not given in 1929-1930.

ED. 205 f-s. *Psychiatric Problems in Education* (3-3).

This course is open to graduate students who have sufficient background in psychology and education and have demonstrated ability to undertake a minor research. Conducted at the Washington Child Research Center. Hours to be arranged. (Sherman.)

ENGLISH LANGUAGE AND LITERATURE

Courses for Graduates and Advanced Undergraduates

ENG. 105 s. *Poetry of the Romantic Age* (3)—Three lectures. Prerequisite, Eng. 7 f and 8 s or Comp. Lit. 105, first semester. A study of the Romantic movement in England as illustrated in the works of Shelley, Keats, Byron, Wordsworth, Coleridge. (Hale.)

(This course is identical with the second semester of Comp. Lit. 105 y.)

ENG. 118 y. *Literature of the Fourteenth Century* (4)—Prerequisite, Eng. 7 f.

Lectures and assigned readings in English literature at the close of the Middle Ages and the beginning of the Renaissance in England, including the metrical romances, ballads, and selections from Langland, Gower, and Chaucer. (Hale.)

ENG. 119 y. *Anglo-Saxon* (6)—Required of all students whose major is English.

A study of Anglo-Saxon (Old English) grammar and literature. Lectures on the principles of comparative philology and phonetics. (House.)

ENG. 122 f. *The Novel* (2)—Two lectures.

Lectures on the principles of narrative structure and style. Class reviews of selected novels, chiefly from English and American sources. (House.)

ENG. 123 s. *The Novel* (2).

Continuation of Eng. 122 f. (House.)

ENG. 124 f. *English and American Essays* (2)—Two lectures.

A study of the philosophical, critical, and familiar essays of England and America; Bacon, Lamb, Macaulay, Carlyle, Ruskin, Emerson, Chesterton. (House.)

ENG. 125 s. *Authorship* (2)—Two lectures. Admission to class on recommendation of instructor.

Practice in the making of literature of various types: verse, essay, fiction, drama. (House.)

ENG. 126 f. *Victorian Poets* (2)—Two lectures.

Studies in the poetry of Tennyson, Browning, Arnold, Swinburn, and others.

ENG. 127 s. *Victorian Poets* (2).

Continuation of Eng. 126 f. (House.)

ENG. 129 f or s. *College Grammar* (3)—Three lectures. Required of all students whose major is English. The course is completed each semester.

Studies in the descriptive grammar of modern English, with some account of the history of forms. (Harman.)

ENG. 130 f. *The Old Testament as Literature*—Two lectures.

A study of the sources, development, and literary types. (Hale.)

Courses for Graduates

ENG. 201. *Seminar*—Credit proportioned to the amount of work and ends accomplished. (Staff.)

Original research and the preparation of dissertations looking toward advanced degrees.

ENG. 202 y. *Beowulf* (4)—Prerequisite, Eng. 119 y.

Critical study of grammar and versification, with some account of the legendary lore. (Harman.) Alternate with Eng. 203 f and 204 s.

ENG. 203 f. *Middle English* (2)—Prerequisite, Eng. 119 y.

A study of excerpts of the Middle English period, with reference to etymology and syntax. (Harman.)

ENG. 204 s. *Gothic* (2)—Prerequisite, Eng. 119 y.

A study of the forms and syntax, with readings from the Ulfilas Bible. Correlation of Gothic speech sounds with those of Old English. (House.) Eng. 203 f and 204 s alternate with Eng. 202 y.

ENTOMOLOGY

Courses for Graduates and Advanced Undergraduates

ENT. 101 y. *Economic Entomology* (6)—Three lectures.

An intensive study of the problems of applied entomology, including life history, ecology, behavior, distribution, parasitism, and control. (Cory.)

ENT. 102 y. *Economic Entomology* (4)—Two laboratories.

Expansion of Ent. 101 y to include laboratory and field work in economic entomology. (Cory.) Not offered in 1929-1930.

ENT. 103 y. *Seminar* (1)—Time to be arranged.

Presentation of original work, book reviews, and abstracts of the more important literature. (Cory, Knight.)

ENT. 104 y. *Insect Pests of Special Groups* (8)—Prerequisite, Ent. 1 f or s.

A study of the principal insects of one or more of the following groups, founded upon food preferences and habitat. The course is intended to give the general student a comprehensive view of the insects that are of importance in his major field of interest and detailed information to the student specializing in entomology.

Insect Pects of 1. Fruit. 2. Vegetables. 3. Flowers, both in the open and under glass. 4. Ornamentals and Shade Trees. 5. Forests. 6. Field Crops. 7. Stored Products. 8. Live Stock. 9. The Household. Nos. 1 and 2 offered in 1929-1930 and such others as requests may indicate to be in demand. (Cory-Knight.)

Courses for Graduates

ENT. 201. *Advanced Entomology* (2).

Studies of minor problems in morphology, taxonomy, and applied entomology, with particular reference to preparation for individual research. (Cory.)

ENT. 202 y. *Research in Entomology* (6-10).

Advanced students having sufficient preparation, with the approval of the head of the department, may undertake supervised research in morphology, taxonomy, or biology and control of insects. Frequently the student may be allowed to work on Station or State Horticultural Department projects. The student's work may form a part of the final report on the project and be published in bulletin form. A dissertation, suitable for publication, must be submitted at the close of the studies as a part of the requirements for an advanced degree. (Cory.)

GENETICS AND STATISTICS

Courses for Graduates and Advanced Undergraduates

GEN. 101 f. *Genetics* (3)—Two lectures; one laboratory.

A general course designed to give an insight into the principles of genetics or of heredity, and also to prepare students for later courses in the breeding of animals or of crops. (Kemp.)

GEN. 102 s. *Advanced Genetics* (3)—Two lectures; one laboratory. Prerequisites, Gen. 101 f. Alternate year course.

A consideration of chromosome irregularities and other mutations, interspecies crosses, genetic equilibrium, and the results of artificial attempts to modify germplasm. (Kemp.)

GEN. 111 f. *Statistics* (2)—Two lectures.

A study of the collection, analysis, interpretation, and presentation of statistics. The course includes a study of expressions of type, variability, and correlation, together with the making of diagrams, graphs, charts, and maps. (Kemp.)

GEN. 112 s. *Advanced Statistics* (2)—Two lectures. Prerequisite, Gen. 111 f or its equivalent.

A study of the theory of error, measures of relationship, multiple and partial correlation, predictive formulas, curve fitting. (Kemp.)

Courses for Graduates

GEN. 201 y. *Research*—Credit according to work done. (Kemp.)

HISTORY AND POLITICAL SCIENCE

A. History

Courses for Graduates and Advanced Undergraduates

H. 101 f. *American Colonial History* (3)—Three lectures and assignments. Prerequisite, H. 2 y.

A study of the political, economic, and social development of the American people from the discovery of America through the formation of the Constitution. (Crothers.)

H. 102 s. *Recent American History* (3)—Three lectures. Prerequisite, H. 2 y.

The history of national development from the close of the reconstruction period to the present time. (Crothers.)

H. 103 y. *American History 1790-1865* (4)—Two lectures. Prerequisite, H. 2 y.

The history of national development to the reconstruction period. (Crothers.)

H. 104 y. *World History Since 1914* (6)—Three lectures.

A study of the principal nations of the world since the outbreak of the World War. (Alternates with H. 104 y.) (Jaeger.)

H. 105 y. *Diplomatic History of Europe in the Nineteenth and Twentieth Centuries* (6)—Three lectures.

A study of the European nations, stressing their political problems and their political activities. (Alternates with H. 103 y. Not given in 1929-1930.) (Jaeger.)

H. 106 s. *History of Maryland* (2)—Two lectures.

A study of the Colony of Maryland and its development into statehood. (Spence.)

H. 107 f. *Ancient Civilization* (3)—Three lectures. Required of students taking a major or minor in Classical Languages.

Treatment of ancient times, including Geography, Mythology, and Philosophy. (Spence.)

H. 108 y. *American Diplomacy* (4)—Two lectures.

A study of American foreign policy. (Alternates with H. 109 y. Not given in 1929-1930.) (Crothers.)

H. 109 y. *History of the American Frontier* (4)—Two lectures.

The development of the West. (Alternates with H. 108 y.) (Crothers.)

B. Political Science

Courses for Graduates and Advanced Undergraduates

Pol. Sci. 101 f. *American Municipal Government* (2)—Two lectures. Prerequisite, Pol. Sci. 2 f.

A study of American City Government; organization and administration; city manager and commission plans; initiative, referendum, and recall. (Schulz.)

Pol. Sci. 102 y. *Constitutional Law and History of the United States* (4)—Two lectures and cases. Prerequisite, Pol. Sci. 2 f. Seniors and graduate students.

A study of the historical background of the Constitution and its interpretation. (Alternates with Pol. Sci. 103 y. May not be given 1929-1930.) (Schulz.)

Pol. Sci. 103 y. *International Law* (4)—Two lectures and cases. Prerequisite, Pol. Sci. 2 f. Seniors and graduate students.

A study of the sources, nature, and sanction of international law, peace, war, and neutrality. (Alternates with Pol. Sci. 102 y. May not be given 1929-1930.) (Schulz.)

Pol. Sci. 104 s. *Political Parties in the United States* (3)—Prerequisite, Pol. Sci. 2 f.

The development and growth of American political parties. Party organization and machinery. (Schulz.)

HORTICULTURE

Courses for Graduates and Advanced Undergraduates

Hort. 101 f. *Commercial Fruit Growing* (3)—Two lectures; one laboratory. Prerequisites, Hort. 1 f.

The proper management of commercial orchards in Maryland. Advanced work is taken up on the subject of orchard culture, orchard fertilization, picking, packing, marketing, and storing of fruits; orchard by-products; orchard heating, and orchard economics. (Not offered in 1930-1931.) Given in alternate years. (Whitehouse.)

Hort. 102 f. *Economic Fruits of the World* (2)—Two lectures. Prerequisites, Hort. 1 f and Hort. 101 f.

A study is made of the botanical, ecological, and physiological characteristics of all species of fruit-bearing plants of economic importance, such as the date, pineapple, fig, olive, banana, nut-bearing trees, citrus fruits, and newly introduced fruits, with special reference to their cultural requirements in certain parts of the United States and the insular possessions. All fruits are discussed in this course which have not been discussed in a previous course. (Not offered in 1930-1931.) Given in alternate years. (Whitehouse.)

Hort. 103 f. *Tuber and Root Crops* (2)—One lecture; one laboratory. Prerequisites, Hort. 11 s and 12 f. (Not offered in 1929-1930.) Given in alternate years.

A study of white potatoes and sweet potatoes, considering seed, varieties, propagation, soils, fertilizers, planting, cultivation, spraying, harvesting, storing, and marketing.

Hort. 104 s. *Advanced Truck Crop Production* (1)—Prerequisites, Hort. 11 s, 12 f, and 13 s.

A trip of one week is made to the commercial trucking section of Maryland, Delaware, New Jersey, and Pennsylvania. A study of the markets in several large cities is included in this trip. Students are required to hand

in a detailed report of this trip. The cost of such a trip should not exceed thirty dollars per student. The time will be arranged each year with each class.

HORT. 105 f. *Systematic Olericulture* (3)—Two lectures; one laboratory. Prerequisites, Hort. 11 s and 103 f. (Not offered in 1930-1931.) Given in alternate years.

A study of the classification and nomenclature of vegetables. Descriptions of varieties and adaptation of varieties to different environmental conditions.

HORT. 106 y. *Plant Materials* (5)—One lecture; one or two laboratories. (Not offered in 1930-1931.) Given in alternate years.

A field and laboratory study of trees, shrubs, and vines used in ornamental planting. (Thurston.)

Courses for Graduates

HORT. 201 y. *Experimental Pomology* (6)—Three lectures.

A systematic study of the sources of knowledge and opinion as to practices in pomology; methods and difficulties in experimental work in pomology and results of experiments that have been or are being conducted in all experiment stations in this and other countries. (Auchter.)

HORT. 202 y. *Experimental Olericulture* (6)—Three lectures.

A systematic study of the sources of knowledge and opinion as to practices in vegetable growing; methods and difficulties in experimental work in vegetable production and results of experiments that have been or are being conducted in all experiment stations in this and other countries.

HORT. 203 s. *Experimental Floriculture* (2)—Two lectures.

A systematic study of the sources of knowledge and opinion as to practice in floriculture are discussed in this course. The results of all experimental work in floriculture which have been or are being conducted will be thoroughly discussed. (Thurston.)

HORT. 204 s. *Methods of Research* (2)—One lecture; one laboratory.

For graduate students only. Special drill will be given in the making of briefs and outlines of research problems, in methods of procedure in conducting investigational work, and in the preparation of bulletins and reports. A study of the origin, development, and growth of horticultural research is taken up. A study of the research problems being conducted by the Department of Horticulture will be made, and students will be required to take notes on some of the experimental work in the field and become familiar with the manner of filing and cataloging all experimental work. (Auchter.)

HORT. 205 y. *Advanced Horticultural Research and Thesis* (4, 6, or 8.)

Graduate students will be required to select problems for original research in pomology, vegetable gardening, floriculture, or landscape gardening. These problems will be continued until completed, and final results are to be published in the form of a thesis. (Auchter, Geise, Schrader.)

HORT. 206 y. *Advanced Horticultural Seminar* (2).

This course will be required of all graduate students. Students will be required to give reports either on special topics assigned them, or on the progress of their work being done in courses. Members of the departmental staff will report special research work from time to time. (Auchter.)

Special Requirements of Graduate Students in Horticulture

Pomology—Graduate students specializing in Pomology who are planning to take an advanced degree will be required to take or offer the equivalent of the following courses: Hort. 1 f, 2 f, 101 f, 102 f, 201 y, 204 s, 205 y, and 206 y; General Biochemistry 102 f; Plant Biochemistry 201 s; Plant Biophysics 202 f; Plant Ecology (Plt. Phys. 101 s), and Organic Chemistry (Chem. 8 y).

Olericulture—Graduate students specializing in vegetable gardening who are planning to take an advanced degree will be required either to take or offer the equivalent of the following courses: Hort. 12 f, 13 s, 103 f, 105 f, 202 y, 204 s, 205 y, and 206 y; General Biochemistry 102 f; Plant Biochemistry 201 s; Plant Biophysics 202 f; Plant Ecology (Plt. Phys. 101 s), and Organic Chemistry (Chem. 8 y).

Floriculture—Graduate students specializing in floriculture who are planning to take an advanced degree will be required to take or offer the equivalent of the following courses: Hort. 22 y, 23 y, 24 s, 25 y, 26 f, 203 s, 204 s, 205 y, and 206 y; General Biochemistry 102 f; Plant Biophysics 202 f; Plant Biochemistry 201 s; Botany 103 f or s, and Organic Chemistry (Chem. 8 y).

Landscape Gardening—Graduate students specializing in landscape gardening who are planning to take an advanced degree will be required to take or offer the equivalent of the following courses: Hort. 32 f, 33 s, 35 f, 105 f, 204 s, and 206 y; Botany 103 f or s; Drafting 1 y and 2 y, and Plane Surveying 1 f and 2 s.

Additional Requirements—In addition to the above required courses, all graduate students in horticulture are advised to take physical and colloidal chemistry.

Unless graduate students in Horticulture have had some course work in entomology, plant pathology, genetics, and biometry, certain of these courses will be required.

Note: For courses in Biochemistry and Biophysics, see Plant Physiology.

Courses for Graduates and Advanced Undergraduates

MATH. 101 f. *The Mathematical Theory of Investment* (3)—Three lectures. To be followed by Math. 102 s. Open to Juniors and Seniors. Required of students in Business Administration.

The application of mathematics to financial transactions; compound interest and discount, construction and use of interest tables, sinking funds, annuities, depreciation, valuation and amortization of securities, building and loan associations, life insurance, etc. (Aldrich.)

MATH. 102 s. *Elements of Statistics* (3)—Three lectures. A continuation of Math. 101 f. Prerequisite, Math. 101 f. Open to Juniors and Seniors. Required of students in Business Administration.

A study of the fundamental principles used in statistical investigation. (Aldrich.)

MATH. 103 f. *Differential Equations* (3)—Three lectures. Elective. Prerequisite, Math. 6 s or Math. 7 y.

Integration of ordinary differential equations. Total differential equations and partial differential equations are also considered. (Dantzig.)

MATH. 104 s. *Differential Geometry* (3)—Three lectures. Elective. Prerequisite, Math. 6 s or 7 y.

Applications of the calculus to plane and skew curves. Theory of Surfaces. (Dantzig.)

MATH. 105 f. *Advanced Algebra* (3)—Three lectures. Elective.

Matrices and determinants. Invariants. Linear Substitutions. Finite Groups, Quadratic Forms, Theory of Equations. (Dantzig.) (Not given 1929-1930.)

MATH. 106 s. *Advanced Topics in Geometry* (3)—Three lectures. Elective.

Homogeneous Co-ordinates. Principles of Projective Geometry. Theory of Algebraic Curves. Infinite Groups. (Dantzig.) (Not given in 1929-1930.)

MATH. 107 f. *Functions of a Complex Variable* (3)—Three lectures. Elective.

Theory of Functions. Conformal Transformations. Development into Series. Applications to Integral Calculus. (Dantzig.)

MATH. 108 s. *Theoretical Mechanics* (3)—Three lectures. Elective.

Statics, Kinematics and Dynamics. Vector and Tensor Calculus. (Dantzig.)

MATH. 109 y. *Selected Topics in Mathematics* (4)—Two lectures. Elective.

The purpose of the course is to enable advanced students in Physics, Chemistry, Biology, and Economics to understand such mathematics as is encountered in modern scientific literature in the fields named. The course begins with a review of general college mathematics from a mature standpoint. Applications to various problems of thermodynamics, physical chemistry, economic and biometric statistics will be made for illustrative purposes. (Not given in 1929-1930.) (Dantzig.)

MATH. 110 y. *Applied Mathematics* (6)—Two lectures and one seminar. Principles and methods used in the mathematical problems encountered in the Applied Sciences. This course is intended for advanced students in Science and Engineering and aims to train them in the mathematical formulation of problems in which they are engaged and in the practical solution of these problems. Numerous applications will be considered. (Dantzig.)

Courses for Graduates

MATH. 201. *Seminar and Thesis*—Credit hours according to work done. (Dantzig.)

MODERN LANGUAGES

A. French

Courses for Graduates and Advanced Undergraduates

(French 4 y, 5 y, 6 f, and 7 s, or equivalent, are prerequisite for courses in this group.)

FRENCH 101 f. *History of French Literature in the Seventeenth Century* (3)—Three lectures. (Not given 1929-1930.) (Deferrari.)

FRENCH 102 s. *History of French Literature in the Eighteenth Century* (3)—Three lectures. (Not given 1929-1930.) (Deferrari.)

FRENCH 103 f. *History of French Literature in the Nineteenth Century* (3)—Three lectures. (Not given 1929-1930.) (Deferrari.)

FRENCH 104 s. *History of French Literature in the Nineteenth Century* (Continuation of French 103 f.) (3)—Three lectures. (Not given in 1929-1930.) (Deferrari.)

FRENCH 105 f. *The Renaissance in France* (3) Study of the literature of the period—Three lectures. (Deferrari.)

FRENCH 106 s. *The Renaissance in France* (3) Continuation of French 105 f—Three lectures. (Deferrari.)

Courses for Graduates

FRENCH 201 y. *Introduction to French Philology* (6)—Three lectures. (Deferrari.)

FRENCH 202 y. *Research and Thesis.* Credits determined by work accomplished. (Deferrari.)

Attention is also called to Comparative Literature 105, *Romanticism in France, Germany, and England.*

B. German

Courses for Graduates and Advanced Undergraduates

(Prerequisite for courses in this group, German 4 and 5 or equivalent.)

GERMAN 101 f. *German Literature of the Eighteenth Century* (3)—Three lectures. The earlier classical literature. (Not given 1929-1930.) (Zucker.)

GERMAN 102 s. *German Literature in the Eighteenth Century* (3)—Three lectures. The latter classical literature. (Not given 1929-1930.) (Zucker.)

GERMAN 103 f. *German Literature of the Nineteenth Century* (3)—Three lectures. Romanticism and young Germany. (Zucker.)

GERMAN 104 s. *German Literature of the Nineteenth Century* (3)—Three lectures. The literature of the Empire. (Zucker.)

Courses for Graduates

GERMAN 205 y. *Research and Thesis.*—Credits determined by work accomplished. (Zucker.)

C. Spanish

Courses for Graduates and Advanced Undergraduates

SPANISH 101 f. *Masterpieces of Spanish Literature* (3)—Three lectures. (Not given 1929-1930.) (Deferrari.)

SPANISH 102 s. *Masterpieces of Spanish Literature* (Continuation of Spanish 101 f.) (3)—Three lectures. (Not given 1929-1930.) (Deferrari.)

SPANISH 103 y. *Introduction to Spanish Philology* (6)—Three lectures. (Deferrari.)

D. Comparative Literature

Courses for Graduates and Advanced Undergraduates

The courses in Comparative Literature are, for the time being, under the direction of the Department of Modern Languages. They may be elected as partially satisfying major and minor requirements in this department. Comparative Literature 101 f, 104 s, and 105 y may also be counted toward a major or minor in English.

COM. LIT. 101 f. *Introduction to Comparative Literature* (3)—Three lectures.

Survey of the background of European literature through study in English translation of Greek and Latin literature. Special emphasis is laid on the development of the epic, tragedy, comedy, and other typical forms of literary expression. The debt of modern literature to the ancients is discussed and illustrated. (Zucker.)

COM. LIT. 102 s. *Introduction to Comparative Literature* (3)—Three lectures.

Continuation of 101 f; study of medieval and modern Continental literature. (Zucker.)

COM. LIT. 104 s. *The Modern Ibsen.* Lectures on the life of Ibsen and the European drama in the middle of the Nineteenth Century. Study of Ibsen's social and symbolical plays in Archer's translation. (Zucker.)

COM. LIT. 105 y. *Romanticism in France, Germany, and England* (6)—Two lectures and reports.

Introduction to the chief authors of the Romantic movement in England, France, and Germany, the latter two groups being read in English translation. Lectures on the chief thought currents and literary movements of the late eighteenth and early nineteenth centuries. First semester: Rosseau to Gautier; Buerger to Heine. Second semester: Wordsworth, Coleridge, Gautier; Buerger to Heine. Second semester: Wordsworth, Coleridge, Landor, Byron, Shelley, Keats, and others. The course is conducted by members of both the Modern Language and the English departments. (Deferrari, Zucker, Hale.)

PHILOSOPHY

Courses for Graduates and Advanced Undergraduates

PHIL. 101 f. *Introduction to Philosophy* (3)—Three lectures and assignments.

A study of the meaning and scope of philosophy; its relations to the arts, sciences, and religion. To be followed by Phil. 102 s. (Spence.)

PHIL. 102 s. *Problems and Systems of Philosophy* (3)—Three lectures and reports on the reading of representative works. Prerequisite, Phil. 101 f.

Study of the problems and systems of philosophy, together with tendencies of present-day thought. (Spence.)

PHIL. 104 y. *History of Philosophy* (6)—Three lectures. Senior standing required.

A study of the development of philosophy from prehistoric times, through Greek philosophy, early Christian philosophy, medieval philosophy to modern philosophical thought. (May be omitted in 1929-1930.) (Spence.)

MYTH. 101 s. *Mythology* (1)—One lecture.

Origin and reason of folklore and myth. Comparison of myths, mythology and modern thought. (Spence.)

PHYSICS

Courses for Graduates and Advanced Undergraduates

PHYS. 101 f. *Physical Measurements* (3)—Two lectures; one laboratory. Prerequisite, Phys. 1 y or 2 y.

This course is designed for the study of physical measurements and for familiarizing the student with the manipulation of the types of apparatus used in experimentation in physical problems. (Clark.)

PHYS. 102 y. *Graphic Physics* (2)—One lecture. Prerequisite, Phys. 1 y or 2 y.

A study of physical laws and formulae by means of scales, charts, and graphs. (Eichlin.)

PHYS. 103 f. *Advanced Physics* (3 or 4)—Three lectures; one laboratory. Prerequisite, Phys. 1 y or 2 y.

An advanced study of Mechanics and Molecular Physics. (Not given in 1929-1930.) (Eichlin.)

PHYS. 104 s. *Advanced Physics* (3 or 4)—Three lectures; one laboratory. Prerequisite, Phys. 1 y or 2 y.

An advanced study of wave motion, sound, and heat. (Not given in 1929-1930.) (Eichlin.)

PHYS. 105 f. *Advanced Physics* (3 or 4)—Three lectures; one laboratory. Prerequisite, Phys. 1 y or 2 y.

An advanced study of electricity and magnetism. (Eichlin.)

PHYS. 106 s. *Advanced Physics* (3 or 4)—Three lectures; one laboratory. Prerequisite, Phys. 1 y or 2 y.

An advanced study of optics. (Eichlin.)

PHYS. 107 y. *Specialized Physics* (6)—Three lectures. Prerequisite, Phys. 1 y or 2 y.

A study of physical phenomena in optics, spectroscopy, conduction of electricity through gases, etc. (Eichlin.)

Courses for Graduates

PHYS. 201 y. *Modern Physics* (6)—Three lectures.

A study of some of the problems encountered in modern physics. (Eichlin.)

PLANT PATHOLOGY

Courses for Graduates and Advanced Undergraduates

PLT. PATH. 101 s. *Diseases of Fruits* (2-4)—Two lectures; laboratory according to credit desired. Prerequisite, Plt. Path. 1 f. Not offered in 1930-1931.

An intensive study intended to give a rather thorough knowledge of the subject matter, such as is needed by those who expect to become advisers in fruit production, as well as those who expect to become specialists in plant pathology.

PLT. PATH. 102 s. *Diseases of Garden and Field Crops* (2-4)—Two lectures; laboratory according to credit desired. Prerequisite, Plt. Path. 1 f. Not offered in 1929-1930.

The diseases of garden crops, truck crops, cereal and forage crops. Intended for students of vegetable culture, agronomy, and plant pathology, and for those preparing for county agent work.

PLT. PATH. 103 f. *Research Methods* (2)—One conference and five hours of laboratory and library work. Prerequisite, Plt. Path. 1 or equivalent.

Technique of plant disease investigations: sterilization, culture media, isolation of pathogens, inoculation methods, single-spore methods, disinfectants, fungicides, photography, preparation of manuscripts, and the literature in the scientific journals and bulletins on these subjects. (Temple.)

PLT. PATH. 104 f and s. *Minor Investigations*—Credit according to work done. A laboratory course with an occasional conference. Prerequisite, Plt. Path. 1 f.

In this course the student may enter or withdraw at any time, including the summer months, and receive credit for the work accomplished. The course is intended primarily to give practice in technique so that the student may acquire sufficient skill to undertake fundamental research. Only minor problems or special phases of major problems may be undertaken. Their solution may include a survey of the literature on the problem under investigation and both laboratory and field work. (Temple and Norton.)

PLT. PATH. 105 s. *Diseases of Ornamentals* (2)—One lecture; one laboratory. Not offered in 1929-1930.

The most important diseases of plants growing in greenhouse, flower garden, and landscape, including shrubs and shade trees. (Temple.)

PLT. PATH. 106 y. *Seminar* (1).

Conferences and reports on plant pathological literature and on recent investigations. (Temple.)

PLT. PATH. 107 f. *Plant Disease Control* (3)—Two lectures; one laboratory. Prerequisite, Plt. Path. 1 f.

An advanced course dealing with the theory and practice of plant disease control; the preparation of sprays and other fungicides and the testing of their toxicity in greenhouse and laboratory; demonstration and other extension methods adapted to county agent work and to the teaching of agriculture in high schools. (Jehle, Temple, Hunter.)

PLT. PATH. 108 f. *Plant Disease Identification*—Credit according to work accomplished. A laboratory and field study with conferences.

An extensive study of symptomatology and mycology leading to the identification of pathogens and the diseases caused by them. (Norton, Temple.)

PLT. PATH. 109 f or s. *Pathogenic Fungi* (2-5)—One lecture and one or more laboratory periods, according to credit. Prerequisites, Bot. 1 f or s and Bact. 1 f or s. Not offered in 1929-1930.

A detailed treatment of the classification, morphology and economics of the fungi, with studies of life histories in culture; identification of field materials. (Norton.)

Courses for Graduates

PLT. PATH. 201 f. *Virus Diseases* (2)—Two lectures. Not offered in 1930-1931.

An advanced course dealing with the mosaic and similar or related diseases of plants, including a study of the current literature on the subject and the working of a problem in the greenhouse. (Temple.)

PLT. PATH. 203 f. *Non-Parasitic Diseases* (3)—Two lectures; one laboratory. Not offered in 1930-1931.

Effects of maladjustment of plants to their environment; injuries due to climate, soil, gases, dusts and sprays, fertilizers; improper treatment and other detrimental conditions. (Norton.)

PLT. PATH. 205 y. *Research*—Credit according to work done. (Norton, Temple.)

PLANT PHYSIOLOGY AND BIOCHEMISTRY

Courses for Graduates and Advanced Undergraduates

PLT. PHYS. 101 s. *Plant Ecology* (3)—One lecture; two laboratories. Prerequisite, Bot. 1 f or s.

The study of plants in relation to their environments. Plant formations and successions in various parts of the country are briefly treated. Much of the work, especially the practical, must be carried on in the field, and for this purpose type regions adjacent to the University are selected.

BIOCHEM. 102 f. *General Biochemistry* (4)—Two lectures; two laboratories. Prerequisites, General Chemistry (Chem. 1 y), Analytical Chemistry (Chem. 7 y) or their equivalents; also an elementary knowledge of organic chemistry.

A general course in chemical physiology treated from the point of view of both plants and animals. The first half of the course is devoted to the chemistry of protoplasm and its products. The second half of the course deals with cell metabolism, and embraces processes and problems of fundamental importance in both animal and plant life. Not given every year. (Appleman, Conrad.)

PLT. PHYS. 103 f. *Plant Microchemistry* (2)—One lecture; one laboratory. Prerequisites, Bot. 1 f or s, Chem. 1 y, or equivalents.

The isolation, identification, and localization of organic and inorganic substances found in plant tissues by micro-technical methods. The use of these methods in the study of metabolism in plants is emphasized. (Conrad.)

Courses for Graduates

PLT. PHYS. 201 s. *Plant Biochemistry* (3 or 4)—Two lectures; one or two laboratories. Prerequisites, Biochem. 102 f or Chem. 104 f and an elementary knowledge of plant physiology.

An advanced course on the chemistry of plant life. It deals with materials and processes characteristic of plant life. Primary syntheses and the

transformations of materials in plants and plant organs are especially emphasized. (Appleman, Conrad.)

PLT. PHYS. 202 f. *Plant Biophysics* (3)—Two lectures; one laboratory. Prerequisites, one year's work in physics and an elementary knowledge of physical chemistry and plant physiology.

An advanced study of the operation of physical forces in plant physiological processes. The relation of climatic conditions to plant growth and practice in recording meteorological data constitute a part of the course. (Johnston.)

PLT. PHYS. 203 s. *Special Problems of Growth and Development* (2)—Not given every year. (Appleman, Johnston.)

PLT. PHYS. 204 y. *Seminar* (2).

The students are required to prepare reports of papers in the current literature. These are discussed in connection with the recent advances in the subject. (Staff.)

PLT. PHYS. 205 y. *Research*—Credit hours according to work done.

Students must be specially qualified by previous work to pursue with profit the research to be undertaken. (Appleman, Johnston.)

PSYCHOLOGY

Courses for Graduates and Advanced Undergraduates

See "Education" for description of the following courses:

ED. 101 f. *Educational Psychology* (3).

ED. 106 s. *Advanced Educational Psychology* (3).

ED. 107 f. *Educational Measurements* (3).

ED. 108 s. *Mental Hygiene* (3).

ZOOLOGY AND AQUICULTURE

Courses for Graduates and Advanced Undergraduates

ZOOL. 101 s. *Embryology* (4)—Two lectures; two laboratories. Prerequisite, two semesters of biology, one of which should be in this department. Required of three-year pre-medical students.

The development of the chick to the end of the fourth day. (Pierson, McConnell.)

ZOOL. 102 y. *Mammalian Anatomy* (2-3)—A laboratory course. Prerequisite, one year of zoology.

A thorough study of the gross anatomy of the cat or other mammal. Open to a limited number of students. The permission of the instructor in charge should be obtained before registering for this course. Schedule to be arranged. (Pierson.)

ZOOL. 105 y. *Aquiculture* (2)—Lectures and laboratory to be arranged. Prerequisites, one course in general zoology and one in general botany.

Plankton studies and the determination of other aquatic life of nearby streams and ponds. Morphology and ecology of representative commercial and game fishes in Maryland, the Chesapeake blue crab, and the oyster. (Truitt.)

Zool. 110 s. *Organic Evolution* (2)—Two lectures. Prerequisites, two semesters of biological science, one of which must be in this department.

The object of this course is to present the zoological data on which the theory of evolution rests. The lectures will be supplemented by discussion, collateral reading, and reports. (Pierson.)

Zool. 115 y. *Vertebrate Zoology*—Credit hours and schedule to be arranged to suit the individual members of the class.

Each student may choose, within certain limits, a problem in taxonomy, morphology, or embryology. (Pierson, McConnell.)

Zool. 120 s. *Genetics* (2)—Two lectures. Prerequisite, one course in general zoology or general botany.

A general introductory course designed to acquaint the student with the fundamental principles of heredity and variation. While primarily of interest to students of biology, it will be of value to those interested in the humanities. (Burhoe.)

Zool. 140. *Marine Zoology*—Credit to be arranged.

This work is given at the Chesapeake Laboratory, which is conducted co-operatively by the Maryland Conservation Department and the Department of Zoology and Aquiculture, on Solomons Island, where the research is directed primarily toward those problems concerned with commercial forms, especially the blue crab and the oyster. The work starts during the third week of June and continues until mid-September, thus affording ample time to investigate complete cycles in life histories, ecological relationships, and plankton contents. Course limited to few students, whose selection will be made from records and recommendations submitted with applications, which should be filed on or before June 1st.

Laboratory facilities, boats of various types fully equipped (pumps, nets, dredges and other apparatus) and shallow water collecting devices are available for the work without extra cost to the student. (Truitt.)

Courses for Graduates

Zool. 200 y. *Zoology Problems.* (Pierson, Truitt, McConnell.)

Twentieth Century Printing Co.
Baltimore, Md.